



Complete Summary

GUIDELINE TITLE

Diagnosis and treatment of forefoot disorders. Section 3. Morton's intermetatarsal neuroma.

BIBLIOGRAPHIC SOURCE(S)

Clinical Practice Guideline Forefoot Disorders Panel, Thomas JL, Blitch EL IV, Chaney DM, Dinucci KA, Eickmeier K, Rubin LG, Stapp MD, Vanore JV. Diagnosis and treatment of forefoot disorders. Section 3. Morton's intermetatarsal neuroma. J Foot Ankle Surg 2009 Mar-Apr;48(2):251-6. [58 references] [PubMed](#)

GUIDELINE STATUS

This is the current release of the guideline.

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SCOPE

DISEASE/CONDITION(S)

Morton's intermetatarsal neuroma

GUIDELINE CATEGORY

Diagnosis
Evaluation
Management
Treatment

CLINICAL SPECIALTY

Family Practice
Neurological Surgery
Orthopedic Surgery
Pathology
Podiatry
Radiology
Rheumatology

INTENDED USERS

Physicians
Podiatrists

GUIDELINE OBJECTIVE(S)

To provide recommendations for the diagnosis and treatment of Morton's intermetatarsal neuroma

TARGET POPULATION

Patients with Morton's intermetatarsal neuroma

INTERVENTIONS AND PRACTICES CONSIDERED

Diagnosis/Evaluation

1. Comprehensive history and physical examination including review of symptoms such as burning pain, tingling/numbness, sharp or radiating pain, sensory deficit
2. Differential diagnosis
3. Clinical maneuvers such as Mulder's sign, Gauthier's test, Bratkowski test
4. Diagnostic testing including radiographs, ultrasound, magnetic resonance imaging (MRI)

Management/Treatment

1. Initial treatment including pads, footwear alteration, and injection therapy
2. Surgical treatment including excision, decompression, and cryogenic neuroablation
3. Re-assessment for continued symptoms

MAJOR OUTCOMES CONSIDERED

Treatment complications

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

A search of medical literature was performed using the EndNote, Medline/PubMed, National Library of Medicine, and Science Direct databases from 1950 to 2008. The terms used were Morton's neuroma andÂ intermetatarsal neuroma.

NUMBER OF SOURCE DOCUMENTS

Not stated

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Weighting According to a Rating Scheme (Scheme Not Given)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Not applicable

METHODS USED TO ANALYZE THE EVIDENCE

Review

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Not stated

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus

DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

Not stated

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Not applicable

COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

METHOD OF GUIDELINE VALIDATION

External Peer Review
Internal Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

Not stated

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

The recommendations for the diagnosis and treatment of Morton's intermetatarsal neuroma are presented in the form of an algorithm with accompanying annotations. An algorithm is provided for Morton's Intermetatarsal Neuroma. Annotations follow.

Morton's Intermetatarsal Neuroma (Pathway 4)

Morton's intermetatarsal neuroma is a compression neuropathy of the common digital nerve. It is most commonly seen in the third intermetatarsal space, but it also can be seen in other intermetatarsal spaces (see Figures 1 and 2 in the original guideline document).

Significant History (Pathway 4, Node 1)

The subjective history reported by the patient is usually characteristic for this entity. The patient may complain of numbness and tingling, and/or radiating, burning pain. The pain often is localized at the plantar aspect of the respective intermetatarsal space, but it can radiate into the adjacent toes. Patients frequently describe a "lump" on the bottom of their foot or a feeling of walking on a rolled-up or wrinkled sock. The symptoms may increase with weightbearing and activity. Closed-toed shoes and especially tight-fitting footwear can increase the symptoms. Patients report relief of symptoms upon removing or changing their shoes. They also may get relief from massaging the foot and moving the toes.

Significant Findings (Pathway 4, Node 2)

Objective findings are unique to Morton's neuroma and can provide further insight to aid the clinician in the diagnostic process. Although patients frequently describe numbness, a sensory deficit may or may not be present on examination. The clinical presentation may demonstrate a splaying or divergence of the digits. Usually little to no edema or inflammation is seen clinically. Reproduction of the pain with palpation to the intermetatarsal space is typical. Care must be taken to press in the intermetatarsal space and avoid the metatarsal heads.

Clinical Maneuvers (Pathway 4, Node 3)

Various clinical maneuvers have been described to assist the clinician in the diagnosis of Morton's neuroma. The patient may demonstrate a Mulder's sign, elicited by squeezing the forefoot and applying plantar and dorsal pressure. A positive test result consists of a click or pop that can be felt or heard; this can be painful to the patient. Symptoms of Morton's neuroma may be replicated through the Gauthier's test, in which the forefoot is squeezed and medial to lateral pressure is applied. Bratkowski described a test that involves hyperextending the

toes and rolling the thumb of the examiner in the area of symptoms. This maneuver may reveal a tender, thickened, longitudinal mass. Patients with Morton's neuroma also may demonstrate Tinel's sign and Valleix phenomenon.

Diagnostic Testing (Pathway 4, Node 4)

Diagnostic testing for a Morton's neuroma may include plain radiography, ultrasound, and magnetic resonance imaging (MRI).

Radiographs should be routinely ordered to rule out musculoskeletal pathology. Neuromas will not be visible on radiographs. Although increased proximity of the adjacent metatarsal heads has been thought to result in more pressure on the intermetatarsal nerve, Grace and colleagues found no statistically significant relationship between radiographic findings and the clinical presence of neuromas.

Ultrasound also has been recommended for diagnostic evaluation of the interspaces. A neuroma will appear as an ovoid mass with hypoechoic signal. This mass will be parallel to the long axis of the metatarsals and is best observed on the coronal view. MRI can be a useful diagnostic tool, but it should be reserved for atypical presentations or to rule out multiple neuromas. The neuroma is best identified on T1 weighted images. It will be revealed as a well-demarcated mass with low signal intensity.

Differential Diagnosis (Pathway 4, Node 5)

The diagnosis of Morton's neuroma requires a careful clinical history correlated with the condition's unique set of characteristics found on examination. Care must be taken to rule out other possible etiologies of symptoms in this area of the forefoot. The differential diagnosis of Morton's neuroma includes:

- Stress fracture
- Neoplasm (e.g., rheumatoid nodule)
- Bursitis
- Metatarsophalangeal joint (MPJ) pathology
- Metabolic neuropathy
- Fibromyalgia and other chronic pain syndromes

Diagnosis (Pathway 4, Node 6)

The diagnosis of Morton's neuroma is primarily a clinical diagnosis that is reached after examination and diagnostic testing have ruled out other possible etiologies of symptoms.

Initial Treatment Options (Pathway 4, Node 7)

Nonsurgical care of Morton's neuroma is centered on alleviating pressure and irritation of the nerve. Initially, patients should wear shoes that have a wide toe box to allow the metatarsals to spread out. High-heel shoes should be avoided.

Metatarsal pads also can be beneficial. These pads, placed proximal to the metatarsal heads, help alleviate pressure on the nerve and assist in spreading out the metatarsals.

Injection therapy includes a variety of alternative approaches to nonsurgical treatment. A local anesthetic block can be used to provide some diagnostic information, but it has not been shown to be therapeutic. Corticosteroid injection is cited as having an 11% to 47% success rate, with multiple injections obtaining better results. Care should be taken to avoid overusing corticosteroid injections; the literature contains reports of atrophy of the plantar fat pad secondary to cortisone injections, as well as joint subluxation. Dilute alcohol injections (3 to 7 injections of 4% alcohol administered at 5 to 10 day intervals) has been associated with an 89% success rate, with 82% of patients achieving complete relief of symptoms. Several other investigators have verified the efficacy of sclerosing injections as a nonsurgical treatment alternative. Another injection modality involves injecting the nerve with vitamin B12 (cyanocobalamin); this has been discussed in the literature, but the effects observed may have been due to the preserving agent, benzyl alcohol. Phenol also has been reported as a safe and effective injection modality.

Surgical Treatment Options (Pathway 4, Node 8)

Excision of the affected portion of the nerve is perhaps the most common approach to neuroma surgery. Excision requires identifying the common digital portion of the nerve and following the structure to the proper digital branches. Care must be taken to avoid other structures in the area. Various surgical approaches have been used, the most common of which is a dorsal incision over the involved intermetatarsal space (see Figure 3 in the original guideline document). Plantar incisional approaches are most often used in revisionary procedures, although they also have been described as an initial surgical approach. Excision may also be elected when prior decompression surgery has failed to resolve symptoms.

Decompression of the intermetatarsal nerve through the use of endoscopic and minimally invasive techniques has been reported in recent years. Open decompression of the nerve by releasing the deep transverse intermetatarsal ligament and performing an external neurolysis has been described. In addition, transposition with nerve release has been shown to be useful.

Cryogenic neuroablation is a minimally invasive procedure that applies a temperature of -50°C to -70°C to the nerve. This results in Wallerian degeneration of the axons and myelin, while leaving the epineurium and perineurium intact. Preserving these structures helps prevent stump neuromas during nerve regeneration; this is the greatest advantage of cryogenic ablation. There are limitations of this procedure. The results are not permanent, and it is not as effective on larger neuromas or in the presence of thick fibrosis. Several investigators have advocated this technique.

Continued Symptoms (Pathway 4, Node 9)

All treatments may have complications, with either ineffective relief of symptoms or worsening of the condition. Careful reassessment in failed surgical

management may reveal tarsal tunnel or other proximal nerve pathology. Complications of surgical procedures include infection, hematoma, stump neuroma formation, and chronic pain syndromes. Surgical failures may require more aggressive surgical intervention including plantar approach and implantation of the proximal portion of nerve into muscle.

CLINICAL ALGORITHM(S)

An algorithm is provided in the original guideline document for Morton's intermetatarsal neuroma.

EVIDENCE SUPPORTING THE RECOMMENDATIONS

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The type of supporting evidence is not specifically stated for each recommendation.

This clinical practice guideline is based upon consensus of current clinical practice and review of the clinical literature.

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

Appropriate diagnosis and treatment of Morton's intermetatarsal neuroma

POTENTIAL HARMS

- Care should be taken to avoid overusing corticosteroid injections; the literature contains reports of atrophy of the plantar fat pad secondary to cortisone injections, as well as joint subluxation.
- All treatments may have complications, with either ineffective relief of symptoms or worsening of the condition.
- Complications of surgical procedures include infection, hematoma, stump neuroma formation, and chronic pain syndromes.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

IMPLEMENTATION TOOLS

Clinical Algorithm
Foreign Language Translations
Patient Resources

For information about [availability](#), see the "Availability of Companion Documents" and "Patient Resources" fields below.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Getting Better
Living with Illness

IOM DOMAIN

Effectiveness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

Clinical Practice Guideline Forefoot Disorders Panel, Thomas JL, Blitch EL IV, Chaney DM, Dinucci KA, Eickmeier K, Rubin LG, Stapp MD, Vanore JV. Diagnosis and treatment of forefoot disorders. Section 3. Morton's intermetatarsal neuroma. J Foot Ankle Surg 2009 Mar-Apr;48(2):251-6. [58 references] [PubMed](#)

ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

2009 Mar-Apr

GUIDELINE DEVELOPER(S)

American College of Foot and Ankle Surgeons - Medical Specialty Society

SOURCE(S) OF FUNDING

American College of Foot and Ankle Surgeons

GUIDELINE COMMITTEE

Clinical Practice Guideline Forefoot Disorders Panel

COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

Clinical Practice Guideline Forefoot Disorders Panel: James L. Thomas, DPM, (Chair), Jacksonville, FL; Edwin L. Blitch, IV, DPM, Charleston, SC; D. Martin Chaney, DPM, San Antonio, TX; Kris A. Dinucci, DPM, Scottsdale, AZ; Kimberly

Eickmeier, DPM, Champaign, IL; Laurence G. Rubin, DPM, Mechanicsville, VA; Mickey D. Stapp, DPM, Augusta, GA; and John V. Vanore, DPM, Gadsden, AL

FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

GUIDELINE STATUS

This is the current release of the guideline.

GUIDELINE AVAILABILITY

Electronic copies: Available in Portable Document Format (PDF) from the [American College of Foot and Ankle Surgeons Web site](#).

AVAILABILITY OF COMPANION DOCUMENTS

None available

PATIENT RESOURCES

The following is available:

- Foot health facts: Foot and ankle conditions. 2009. Available in Spanish and English from the [American College of Foot and Ankle Surgeons consumer Web site](#).

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NGC STATUS

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